

## **Wet-mix Shotcrete. Present situation and new applications in reinforced elements.**

Author: Eduardo Yubero Cambra

Tutor: Lluís Agulló Fité

In context of the constructive process of concrete works it results specially interesting, from the economical point of view, the conjunction of two phases of the process, placing and compacting, in only one action. This characteristic is realized in shotcrete in which occurs the replacement of the formwork by an almost instantaneous setting as well as a compacting by impact against the support.

In this sense the possibility of eliminating the tasks of formwork and following vibrated in the conventional reinforced concrete is emerging as one of the most attractive alternative from a perspective of time and cost minimization.

While the work implementation by spraying can achieve high yields, it also true that induces a series of variations in the material that must be taken into account in the design phase.

Throughout this work are reviewed, but not exclusive, the most relevant differences between a section of structural concrete performed by spraying wet respect to the traditional set (formwork and vibrated). Thus the study focuses on the mechanical properties (compressive strength, elastic modulus, shrinkage, creep ...) as well as aspects related to durability.

After the realization of this study it has been checked how the reinforced shotcrete solution involves significant advantages with respect to execution time, being included always in the context of an execution control that considers and guarantees the main aspects of the text.

In chapter 1 it was defined the general mark and the main objectives that were pursued in this study as well as the methodological questions used in order to get it.

In chapter 2, fruit of an extensive bibliographical revision and, due to the inexistence of technical references to the main object of study of this document, it is presented a general view of the state of art of the wet-mix shotcrete. This revision it is done concretely on properties of the material, normative, procedure of dosing and scopes of application.

In chapter 3 it gives an overview of the main variations introduced by the wet-mix shotcrete in reinforced concrete elements

In chapter 4 are presented the results and the analysis of those ones, resulting of the tests carried out during the realization of the experimental process. This chapter is articulated in two important parts corresponding, one to shotcrete and the other one to self-compacting concrete.

In chapter 5 are explained the conclusions extracted during the realization of the different works of this study. It is attached a last point with bibliography referenced in text and other technical publications asked during the realization of the study.